

**WE CLAIM:**

1. A system of on-line property prediction for hot rolled coils in a hot strip mill comprising :
  - a unit (5) for providing data on rolling schedule with chemistry from the steel making stage;
  - field devices (FD1...FDn) for measuring process parameters during hot rolling;
  - a programmable logic controller (1) for acquiring data of measured parameters from said field devices (FD1...FDn) and feeding said data parameters to a processor (2);
  - means (3) for conversion of the measured data from time domain to space domain using segment tracking;
  - a computation module (4) for processing said converted space domain data for predicting mechanical properties along the length and through the thickness of the strip being rolled; and
  - a display unit (6) for on-line display of the predicted properties.
2. The system as claimed in claim 1, wherein said field devices FD1 ... FDn comprises a pyrometer, a speedometer, a thickness gauge, a solenoid valve etc. for measuring data on process parameters.

3. The system as claimed in claims 1 and 2, wherein said programmable logic controller (1) is a Westinghouse PLC 26 connected to said field devices FD1.. FDn through coaxial cable using remote I/O.
4. The system as claimed in claim 3, wherein said programmable logic controller (1) is configured to capture data from said field devices FD1 .. FDn over 0.01 sec. Using WESTNET I data highway with Daisy Chain Network topology.
5. The system as claimed in the preceding claims, wherein said processor (2) is an ALSTOM VXI 186 processor and the data transfer between said processor (2) and said programmable logic controller (1) is through WESTNET II using coaxial cable with Token Pass Network topology.
6. The system as claimed in the preceding claims, wherein said computation module (4) is provided with a deformation sub-module (4) for determining final austenite grain size after finish rolling.
7. The system as claimed in claim 6, wherein said computation module (4) further comprises a thermal sub-module (42) for determining the temperature drop during radiation while cooling said hot rolled strip.
8. The system as claimed in claim 7, wherein said computation module (4) further comprises a microstructural sub-module (43) for determining the microstructural changes during phase transformation.

9. The system as claimed in claim 8, wherein said computation module (4) further comprises a precipitation sub-module (44) for determining the amount of aluminium nitrogen in the solid solution and in the precipitates after cooling.
10. The system as claimed in claim 9, wherein said computation module (4) is further provided with a structural property correlation sub-module (45) for calculating the yield strength (YS), ultimate tensile strength (UTS) and percentage elongation (EL) based on the phases present.
11. The system as claimed in the preceding claims, wherein said display unit (6) is for displaying a cooling temperature, ferrite grain size, yield strength, ultimate tensile strength, percentage elongation and nitrogen in solid solution/precipitate.
12. The system as claimed in claim 1, wherein said predicted data on mechanical properties along the length and through the thickness of the strip being rolled, outputted from said computation module (4) can be stored in a unit (7) for use by said scheduling unit (5) at production planning and scheduling level.
13. The system as claimed in the preceding claims, wherein a data warehousing device (8) is provided for storing the data generated by said computation module (4).

14. A system of on-line property prediction for hot rolled coil in a hot strip mill substantially as herein described and illustrated.